Expanding the HamSCI PSWS Network

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HamSCI Community

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DASI: Distributed Array of Scientific Instruments

A Distributed Array of Small Instruments (DASI) is designed to address the need for high temporal and spatial resolution measurements to determine the local, regional, and global scale processes that are essential for addressing the fundamental questions in solar and space physics

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DASI: High Temporal Resolution

HamSCI's current GRAPE* instruments are operating 24/7/365, creating, at a minimum, one data point *per second, per instrument*

The future DASI2 instruments will operate similarly - monitoring, collecting, uploading data to a central server

# Station Node Number	N0000063			
# Callsign	AF8A			
# Grid Square	EN91gn			
# Lat Long Elev	41.55123 -81.4588 300			
# City State	Mayfield Village OH			
# Radio1ID	Grape_Gen_1_Rcvr_1			
# Antenna	Chameleon RXL Loop			
# Frequency Standard	LB GPSDO			
# System Info	RasPi4B			
# Beacon Now Decoded	WWV10			
UTC	Freq	Freq Err	Vpk	dBV(Vpk)
2025-01-31T00:00:00Z	9999999.789	-0.211	0.027568	-31.19
2025-01-31T00:00:01Z	9999999.995	-0.005	0.033579	-29.48
2025-01-31T00:00:02Z	10000000.007	0.007	0.038137	-28.37
2025-01-31T00:00:03Z	9999999.920	-0.080	0.045220	-26.89
2025-01-31T00:00:04Z	9999999.845	-0.155	0.045637	-26.81
2025-01-31T00:00:06Z	9999999.603	-0.397	0.037036	-28.63
2025-01-31T00:00:07Z	9999999.535	-0.465	0.032896	-29.66
2025-01-31T00:00:08Z	9999999.570	-0.430	0.031376	-30.07
2025-01-31T00:00:09Z	9999999.604	-0.396	0.034110	-29.34
2025-01-31T00:00:10Z	9999999.838	-0.162	0.036455	-28.76

*GRAPE = Great Radio Amateur Propagtion Experiment

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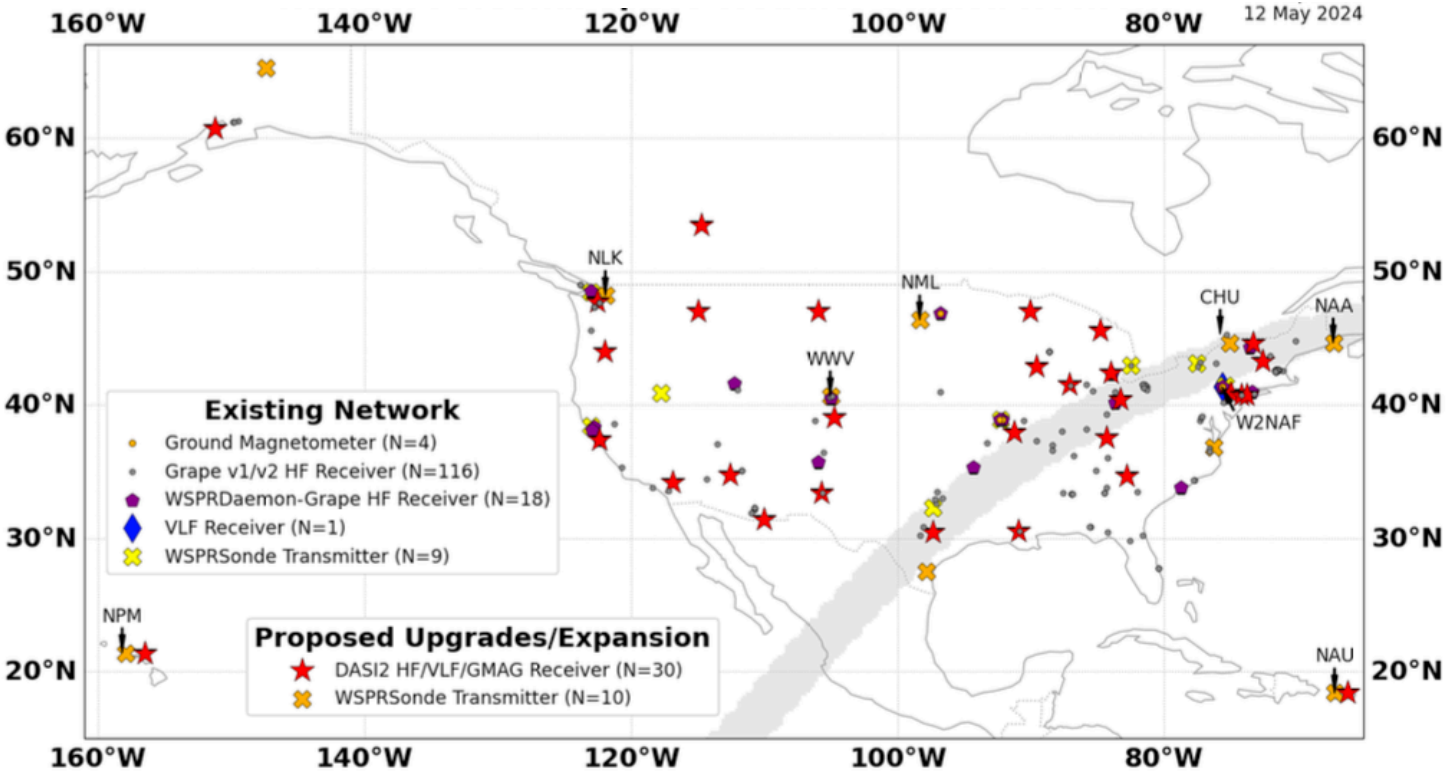
DASI: High Spatial Resolution



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PSWS Network Expansion: Critical Elements

Hardware (HamSCI)
- Wideband HF SDR, VLF Receiving Apparatus, Ground Magnetometer

Software
- SDR Code, VLF Signal Processing, Data Collection Systems

Host Locations
- Co-Located Hardware: HF+VLF+Magnetometer
- Reliable Power
- Reliable Internet
- A Suitable Electromagnetic Environment

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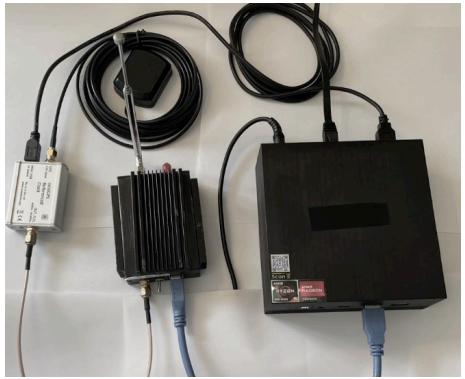
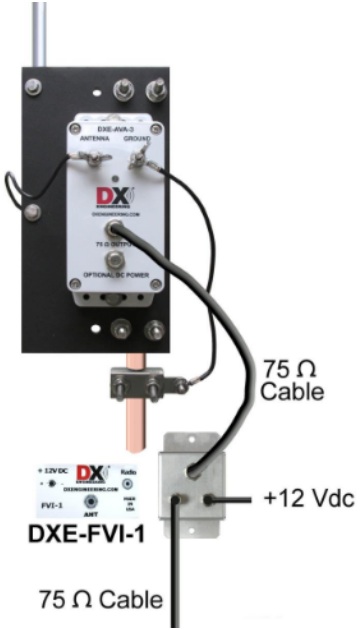
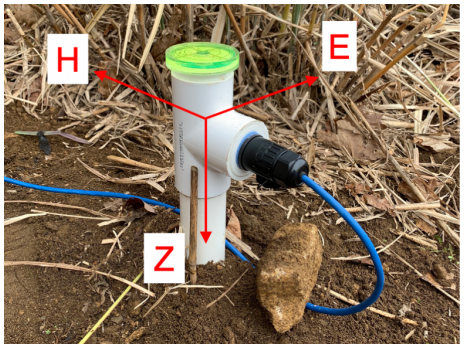
PSWS Hardware - DASI2 VERSION



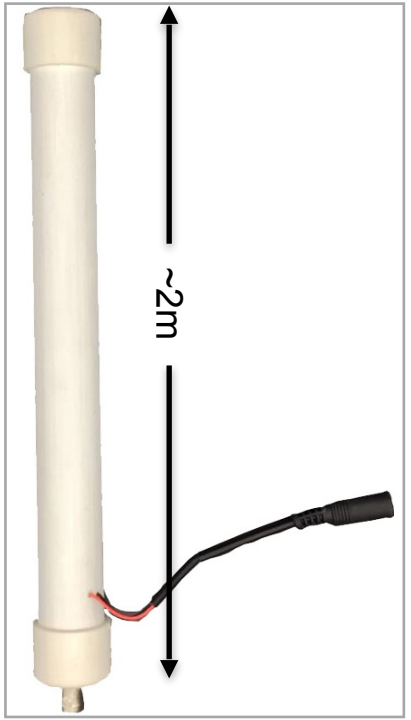
WSPRDaemon Grape



Active HF Antenna



Ground Magnetometer



Active VLF Antenna
+ VLF rx equipment

Images for discussion purposes only - not to scale - actual hardware may be quite different!

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PSWS Network: Critical Elements

Hardware
- Wideband HF SDR, VLF Receiving Apparatus, Ground Magnetometer

Software
- SDR Code, VLF Signal Processing, Data Collection Systems

Host Locations (Community)
- Co-Located Hardware: HF+VLF+Magnetometer
- Reliable Power
- Reliable Internet
- A Suitable Electromagnetic Environment

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Site Selection: Where, Who and How

Herein lies the challenge, finding sites which are…

…'RF Quiet' - on the HF bands. This means minimal noise sources (EMI, powerful local transmitters, mixing products)

…'open field' sites for the VLF antenna - with significant separtion from sources of mains harmonics

…willing to bury a ground magnetometer, and free from electromagnetic influences (current carrying conductors, vehicles, etc.)

Option: Gold and Silver Sites

Gold Sites

- Proven to be ‘RF quiet’ - through site testing, noise source mitigation, and regular surveillance
- Suitable for VLF and magnetometer data collection
- Hosts willing to make what could be significant efforts to maximize reception of HF signals
- HamSCI can assist in the evaluation process

Silver Sites

- Everyone else capable of hosting all three instruments

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Silver Sites

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Self-Funded Sites

HamSCI welcomes participation by all who are interested

- Self-Funded hosts determine their own level of commitment and participation
- They may install one, two or all three instruments
- **Everyone's data is valuable**, as long as their equipment is sound and site suggestions reasonably well adhered to
- These could be classified as either Gold or Silver sites - depending upon the testing, mitigation and surveillance steps performed.

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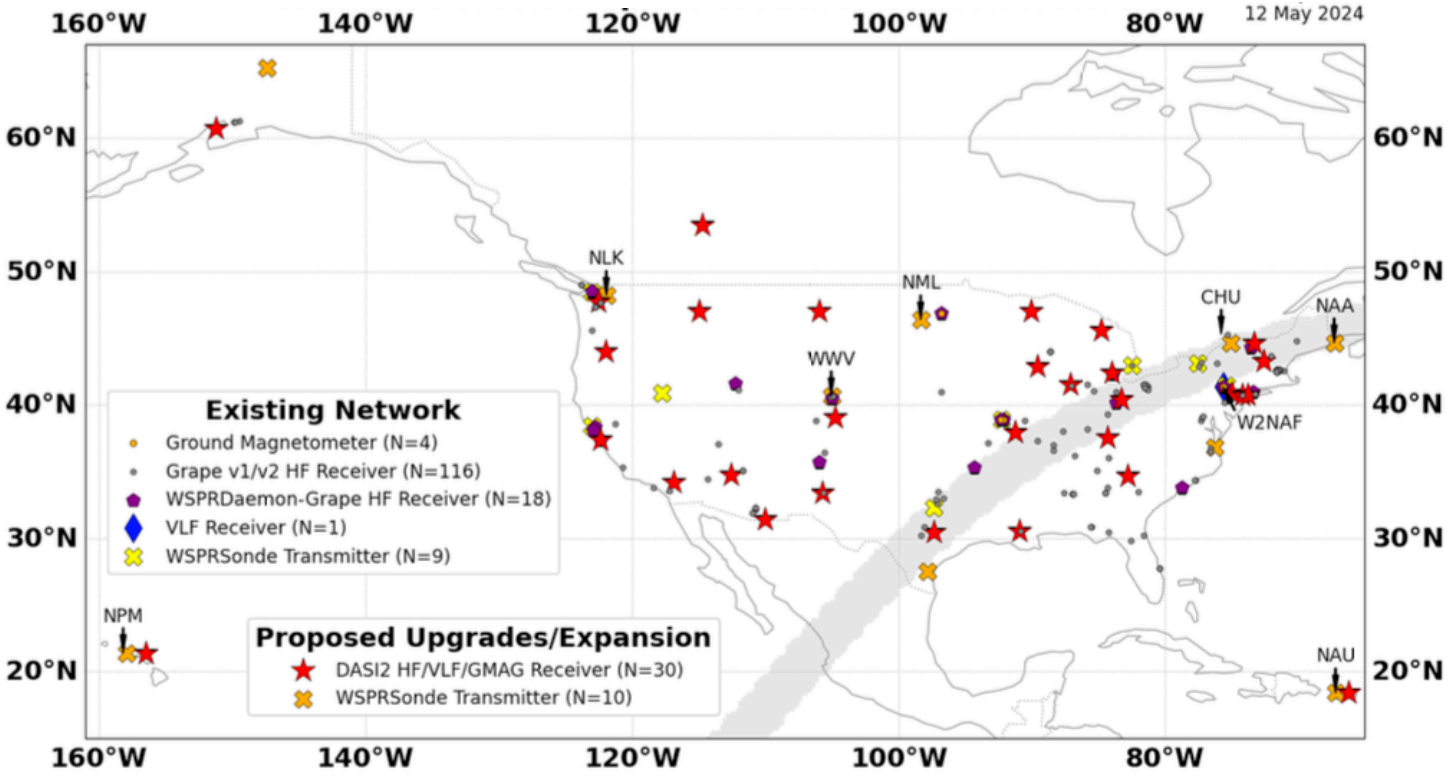
HamSCI is Asking for *Your* Support

We are looking to fill out this map. Hosts and sites are needed across US (red stars)

Deployments may be phased in over the next 6-24 months



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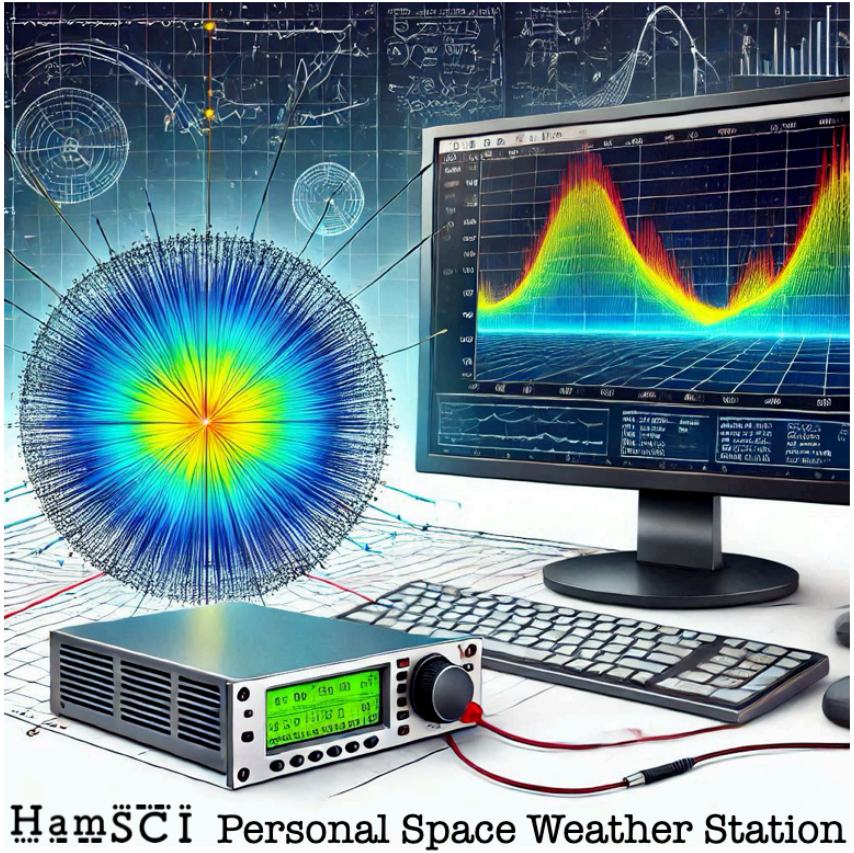
Questions and Sign-Up

Sign up to our list of interested hosts:
hamsci.org/site-search

Questions:
hamsci@hamsci.org



DASI2: NSF HamSCI Grantees, 2025-2028

THE UNIVERSITY OF SCRANTON
A JESUIT UNIVERSITY

THE UNIVERSITY OF ALABAMA

NJIT
New Jersey Institute of Technology

CASE WESTERN RESERVE UNIVERSITY EST. 1826

NSF Grants 2432821, 2432822, 2432823, 283824

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Cycle 25 - Feel the Excitement!

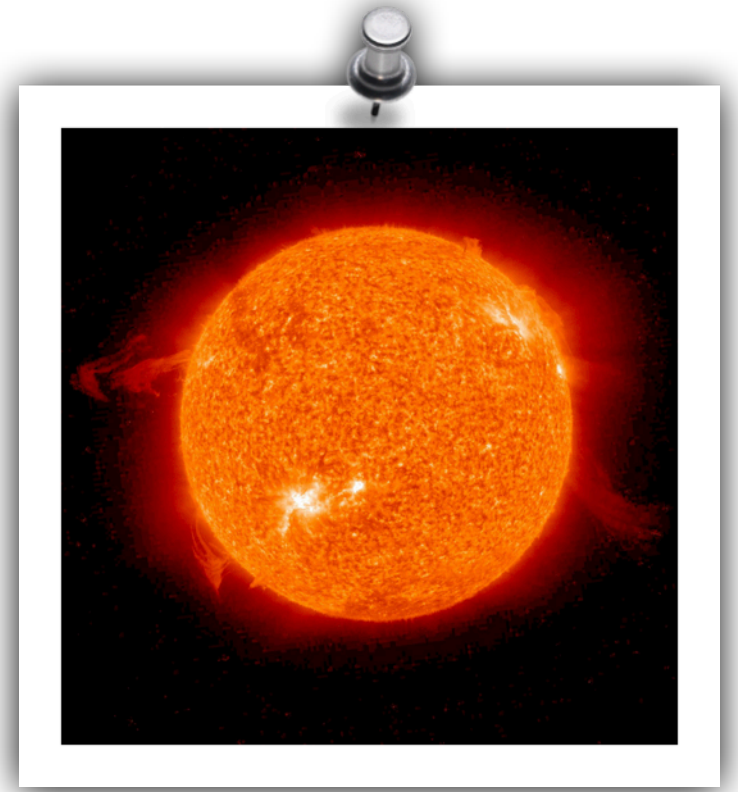

Image: NASA SOHO via GSFC

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